Assessing the usefulness of accounting measures for examining profitability of the State Forests' National Forest Holding

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Abstract. The purpose of this study was to analyse the profitability of the State Forests by using accounting measures and to determine their practical applicability for evaluating the State Forests' activities covering the years 2008–2012. In our assessment, we used the ratios: return on assets, return on equity and return on sales, which were calculated for the four following levels of financial result: operating result and economic activity result, gross profit and net profit. The degree of variability of the analysed ratios was determined for the years 2008–2012. On the basis of our survey, the State Forests' activities were found to be profitable. The ratios return on assets, sales and equity show only slight variation depending on the applied category of financial results. Furthermore, this study confirms that there is a high degree of variation over time. In the years 2008–2012, the profitability ranged from 2% to 13% with the highest profit having been reached in 2011. We conclude that for the State Forests' activity assessment, the profitability ratios established for the category of operating results will be of great significance.

Keywords: forest economics, ratio analysis, profitability ratios

1. Introduction

Profit reached by an economic entity and resulted from its profitability level serves as synthetic measures evaluating its activity. Within the State Forests National Forest Holding, the administrative and regular activities, however, are not evaluated by profit criteria.[1] Nevertheless, the Forest Law (Dz.U. No 12 item 59, 2011) obliges the State Forests (SF) management units to conduct their activities according to sustainable forest management principles. In line with the Art. 50 of the Forest Law, the SF should conduct their activities based on the financial independence principles and to cover their costs from own revenues. Profit generation allows not only to retain financial stability but also to create conditions for implementing all the tasks related to multi-functional forest management.

Effective forest management is, therefore, of basic importance, which could be expressed by the profitability reached by the SF, as only positive financial result guarantees sustainable development of forest economy. Therefore, research and analysis of profitability of the SF units should find their place within the forest management activities.

Profitability ratios, which are widely used in comparative analysis, can be used for assessing the economic activity of businesses. These ratios are of special significance because they represent a combined impact of financial liquidity, asset and debt management on operational results of company's activities (Brigham 1997).

Profitability ratio is a correlation of financial outcome with various economic categories such as earnings relative to sales, costs, assets and capital involved. More commonly, they could be divided into three groups: returns on sales, returns on assets as well as returns on equity (Sierpińska, Jachna 1997).

Currently, even with the appearance of new efficiency assessment metrics, ratios based on accounting profits are still widely used. Accounting profit (from balance sheets) is calculated

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[1] Evaluation is based on the activity compliance with a forest management plan (on the basis of highest profitability).

as a difference between profits and accounted costs. Depending on the type of activity implemented, accounting profit could be expressed as profit from sales, operating profit, gross economic profit, gross profit or net profit (Bednarski 2001).

2. Research goal and extent

The main goal of this research was to analyse the profitability of the State Forests National Forests Holding using the accounting metrics as well as to evaluate the possibilities of using those ratios in assessing the activities of the SF. The study covered the period from 2008 to 2012. The assessment was based on the profitability ratios such as returns on assets, equity and sales, which were defined for various levels of financial outcomes. The value of ratios was established as well as their dynamics through time was analysed.

3. Methods

Evaluation of profitability of the SF was done using the data from annual financial reports (balance sheets of the SF, profit and loss accounts as well as financial statements of the State Forests) from 2008 to 2012. The analysis was based on the profitability ratios, which included returns on sales, assets and equity, that were calculated for the following four levels of financial results:
- Operational level (operating profitability),
- Economic result gross level (economic profitability),
- Gross result level (gross profitability),
- Net result level (net profitability).

Value of profitability ratios was estimated using the following equations:

$$\text{Return on sales} \quad = \quad \frac{W_o \ (\text{or} \ W_g, W_b, W_n)}{P_s} \times 100\%$$

$$\text{Return on assets} \quad = \quad \frac{W_o \ (\text{or} \ W_g, W_b, W_n)}{A} \times 100\%$$

$$\text{Return on equity} \quad = \quad \frac{W_o \ (\text{or} \ W_g, W_b, W_n)}{KW} \times 100\%$$

where:
W_o – operational activity result,
W_g – economic activity result
W_b – gross result,
W_n – net result,
P_s – profits from sales,
A – state of assets,
KW – equity.

The rate of changes in studied economic categories (assets, equity, costs and revenues) as well as profitability ratios during 2008–2012 were also analysed using dynamics of returns based on variable or fixed costs. The base period for the fixed base index was December 31, 2008.

$$\text{Dynamics ratios on the fixed base} \quad = \quad \frac{Z_n - Z_{2008}}{Z_{2008}} \times 100\%$$

$$\text{Dynamics ratios on the variable base} \quad = \quad \frac{Z_n - Z_{n-1}}{Z_{n-1}} \times 100\%$$

where
Z_n – the level of the studied economic category or profitability ratio during the current year,
Z_{n-1} – the level of the studied economic category or profitability ratio during the previous year,
Z_{2008} – the level of the studied economic category or profitability ratio from 2008.

4. Research results

During 2008–2012, the assets of the SF increased more than 50%, from 6 to more than 9 billion PLN. There was also a growth in equity at about a half from 4.7 billion PLN to almost 7 billion PLN. The most beneficial changes occurred in 2011 when assets and equity of the SF grew 20% relative to 2010. Total revenues as well as the total costs of managing forests were showing the growing trend. During the 5-year study period, both economic categories increased by 30% (Table 1).

During 2008–2012, the SF were showing varying level of profitability, which was, first of all, affected by the amount of profits generated by the SF as well as changes occurring in the assets, sales and equity of the SF during the consecutive years of the study period.

The level of generated profits is directly affected by the acquired costs and received revenues of the economic entity. During the study period, both total costs and revenues of the SF increased on an average at 30% (Table 1), whilst during the various years of the study period, a different rate and direction of their changes as well as a share of costs within revenues were observed.

The share of costs within revenues varied between 88% and 97%, (96% in 2008, 97% in 2009, % in 2010, 88% in 2011, 96% in 2012). The level of revenues of the SF was significantly affected by the revenues from timber sales, which amounted on an average about 85% of the total revenues. Demand on timber has been decreasing since 2008. In 2009, timber sales grew about 1 million m³ to the level of 33.3 million m³, whilst at the same time, there was a decre-

Table 1. The value (tys. PLN) and dynamics (%) of economic categories shape the level of profitability in the State Forests in 2008–2012

Specification	Years					Fixed base [2008=100%]				Variable base [%]		
	2008	2009	2010	2011	2012	2009	2010	2011	2012	2010/ 2009	2011/ 2010	2012/ 2011
	thous. PLN											
Assets	6065876	6245991	7066274	8485918	9185768	2.97	16.49	39.90	51.43	13.13	20.09	8.25
Equity	4713462	5014099	5524372	6528277	6968212	6.38	17.20	38.50	47.84	10.18	18.17	6.74
Total revenues	5646505	5210587	6010642	7464435	7355316	-7.72	6.45	32.20	30.26	15.35	24.19	-1.46
Total costs	5405587	5029053	5617431	6603905	7053702	-6.97	3.92	22.17	30.49	11.70	17.56	6.81
Net revenues from sales	5501408	5049566	5742838	7142701	6920485	-8.21	4.39	29.83	25.79	13.73	24.38	-3.11
Profit/loss on sales	134975	83731	208551	669462	-1635	-37.97	54.51	395.99	-101.21	149.07	221.01	-100.24
Profit on operating activities	171142	129115	331439	792603	195863	-24.56	93.66	363.12	14.44	156.70	139.14	-75.29
Profit on business activities	240918	181534	393211	860530	301615	-24.65	63.21	257.19	25.19	116.60	118.85	-64.95
Gross profit	241174	182086	393068	861611	301998	-24.50	62.98	257.26	25.22	115.87	119.20	-64.95
Net profit	222028	167368	367446	829141	259604	-24.62	65.50	273.44	16.92	119.54	125.65	-68.69

Source: Own calculations based on data from the annual financial statements of the State Forests in 2008–2012

ase of 8% in the total timber costs, including the decrease of 12% in the costs of coniferous and broadleaf saw timber (DGLP 2010). Simultaneously, there was a slight hike in the share of total costs within revenues, which resulted in a lower financial results compared to the previous year.

In 2010, there was an improvement in the amount of acquired costs in relation to received revenues. Compared to the preceding year, the share of costs within revenues dropped about 4% to the level of 93%.

The most beneficial relation of revenues to costs occurred in 2011 when the share of costs within revenues was the lowest during the whole study period and was equal to 88%. However, both costs and revenues have increased compared to the previous year, whilst revenues had a higher growth dynamics (Table 1). During that year, the SF produced the highest profit. Simultaneously, that was the year when all the profitability ratios had the highest values. The increase in revenues of the SF occurred as the result of larger sales and, first of all, a significant growth of prices of raw timber. The SF exceeded their sales plan by 2% by selling 35 million m³ of timber. Compared to 2010, timber prices grew by 20%. The largest changes touched the most commonly harvested timber grade in the

SF which is a coniferous saw timber, the prices of which grew more than 26% (DGLP 2012). In 2012, there was a small drop in timber prices. In total, it reached 3%, whilst prices of coniferous peeler timber dropped by 8% (DGLP 2013).

4.1. Profitability of the State Forests in 2008–2012

Such a differentiated state of the analysed economic parameter levels as well as their inter-relations during the various years of the study period had a direct influence on the profitability ratios of the forest economy. Profitability ratios studied through time showed significant changes as well as different directions and rate of change. However, the analysed indicators had only a small variation depending on the used in calculations categories of financial results (Table 2).

4.2. Return on assets

Measuring the size and evaluating the profitability of managing assets by a certain economic entity could be done by using the return on assets indicator.

Return on assets analysed through time showed significant differences coming from changes in asset state as well as changes in generated profits. During 2008–2012, the return on assets of the SF grew from 2% to 10% (Fig. 1). The direction of changes in return on assets agreed with the direction of changes in return on sales.

From 2008 to 2011, the return on assets grew 2.5 to 3 times depending on the level of financial result. The highest growth was observed for the operating return on assets. The return on assets indicators compared in the beginning and at the end of the study period showed a decrease of 17–24% (Table 2).

4.3. Return on equity

The return on equity indicator expresses efficiency of equity involved. The return on equity analysis identifies problems related to the estimation of equity level (Waśniewski, Skoczylas 2002).

Equity presented in balance sheets includes basic share capital, capital reserve, reserve capital, revaluation of fixed assets, undivided profit from previous years as well as profit from current year. It should be remembered that the last component in the case of SF does not totally cover its equity. According to the Regulation of the Council of Ministers from 6 December 1994 related to specific basics of financing in the State Forests (Dz.U. No. 134 item 692, 1994), a special means in the total amount not higher than 15% could be set aside from the positive financial result for the purpose of additional awards, social benefits funds as well as other social goals, including benefits for public utility and educational units.

Whilst estimating the equity value, there was some uncertainty related to reserves, which were clarified after amendments to accounting decree (Dz.U. No. 113 item 1186, 2000). Currently, reserves are treated clearly as liabilities.

During the study period, the return on equity indicators varied from 3% to 13% (Fig. 2). Since 2008 until 2011, the growing tendency was observed and the analysed return on equity indicators grew 2.5–3 times (from 3.6% to more than 12% at the operational level, from 5% to more than 13% at the economic and gross result levels and from 4.7% to 12.7% at the net result level). Afterwards, there was a significant drop in 2012 to the level of 2.8–4.3% (Table 2, Fig. 2). The return on equity compared from the beginning

Table 2. Dynamics of return on sales, assets and equity (%) in the State Forests in 2008–2012

Level of financial result	Profitability ratios		Fixed base [2008=100%]				Variable base [%]		
			2009	2010	2011	2012	2010/2009	2011/2010	2012/2011
Operational level	operating profitability of	sales	-17.68	85.53	256.91	-9.00	125.39	92.37	-74.50
		assets	-26.60	66.31	231.21	-24.47	126.57	99.15	-77.19
		eguity	-28.93	65.29	234.44	-22.59	132.56	102.33	-76.85
Economic result gross level	economic profitability of	sales	-17.81	56.39	175.11	-0.46	90.28	75.91	-63.82
		assets	-26.70	40.05	155.42	-17.38	91.07	82.37	-67.65
		eguity	-29.16	39.33	157.93	-15.26	96.69	85.11	-67.15
Poziom wyniku brutto Gross result level	**rentowność brutto** gross profitability of	sales	-17.58	56.16	175.34	-0.46	89.47	76.32	-63.85
		assets	-26.63	39.70	155.03	-17.34	90.41	82.55	-67.59
		eguity	-29.10	39.06	157.81	-15.43	96.14	85.39	-67.20
Net result level	net profitability of	sales	-18.07	58.42	187.38	-7.18	93.35	81.41	-67.70
		assets	-26.78	42.08	166.94	-22.68	94.03	87.88	-71.03
		eguity	-29.09	41.19	169.64	-20.81	99.10	90.98	-70.63

Source: Own calculations based on data from the annual financial statements of the State Forests in 2008–2012
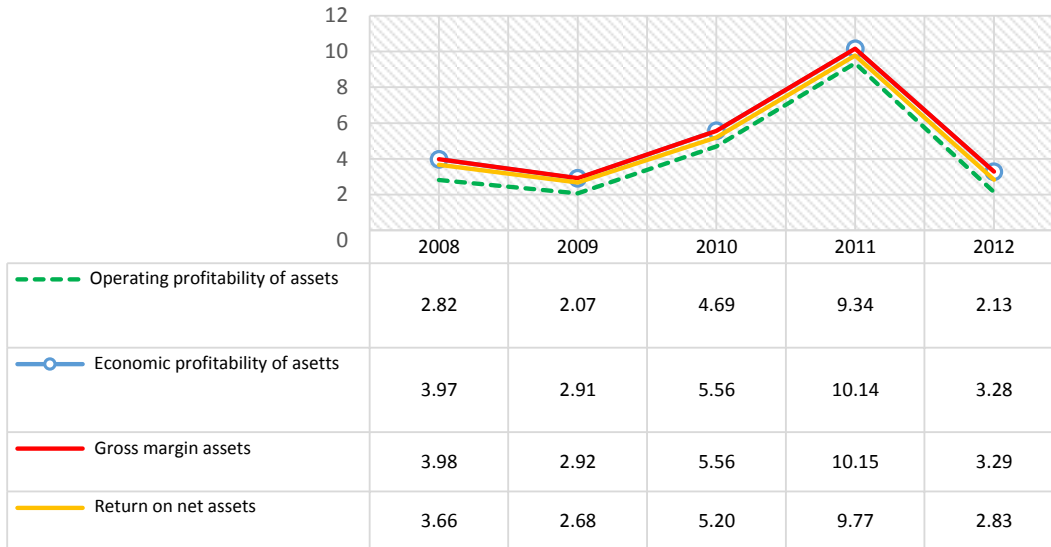
	2008	2009	2010	2011	2012
- - - Operating profitability of assets	2.82	2.07	4.69	9.34	2.13
—○— Economic profitability of asetts	3.97	2.91	5.56	10.14	3.28
—— Gross margin assets	3.98	2.92	5.56	10.15	3.29
—— Return on net assets	3.66	2.68	5.20	9.77	2.83

Figure 1. Return on assets (%) of the State Forests in 2008–2012

Source: Own calculations based on data from the annual financial statements of the State Forests in 2008–2012

to the end of the study period decreased from 15% to 23% depending on the level of financial result.

4.4. Return on sales

The return on sales indicators are used in economic analysis as one of the most common indicators evaluating effects produced by the economic entity. They encompass a special group of return metrics, as they are the only ones which in their structure both within an integer numerator as well as denominator include stream values. Owing to that, practical analysis does not have to include correction for inflation (Bednarski 2001).

During the consecutive years of the study period, the return on sales values of the SF showed large variation, which could be explained by annual changes in sales values as well as the level of generated profits.

In 2008–2011, the return on sales in the SF varied from more than 2% to 12% (Fig. 3).

From 2009, all the analysed return on sales indicators showed a steady growing trend, and in 2011, they reached the highest values. From the beginning of 2012, the trend changed to decreasing and by the end of that year the indicators, depending on the level of financial result, declined by 64–75%. When comparing the beginning to the end of the study period, almost steady level of economic profitability and gross profitability of sales should be noted. There was, however, a slight drop in operating profitability and net profitability ratios, which were 9% and 7%, respectively (Table 3).

4.5. Effect of financial result category on the profitability level of the State Forests

Profitability ratios showed slight variation depending on the various categories of financial result used in the calculations (Table 2).

The lowest returns on sales, assets and equity were obtained by the SF at the operational level of financial result. The operating profitability ratios have a special importance, as they indicate the ability of economic entity to reach profits from the activities for which the entity was organised.

In 2008–2012, operating profitability ratios showed the largest change dynamics compared to those of remaining financial result levels. Higher values of economic profitability ratios compared to operating profitability resulted from favourable relationship of acquired costs to revenues received from economic activities.

In various years of the study period, the economic profitability as well as gross profitability ratios showed insignificant differences. This could indicate an insignificant influence of extraordinary losses and profits on efficiency of economic activities on the scale of the whole SF holding. However, natural disasters would certainly have a significant influence on the level of profitability in forest districts where the effects of such events could have a large impact on the financial result of economic entity.

5. Discussion and conclusions

Profitability is a basic measure of economic activities of a company. It results from decisions taken by a company as well as its accepted economic strategy. In practice, evaluation of business's efficiency is usually done using the profitability ratios based on accounting metrics. Already in 1920s, Donaldson Braun, the creator of the Du Pont model, claimed that profitability ratios could present a good tool for controlling and comparing different businesses (Bednarski 2001).

Whilst evaluating the efficiency of management activities, it would be important to pay a special attention to proper selection of profitability ratios as well as their composition. Because value of ratios is dependent on the values of inter-dependencies taken into consideration in calculation equations as well as their rate and direction of changes, selection of proper category of financial result, which reflects various
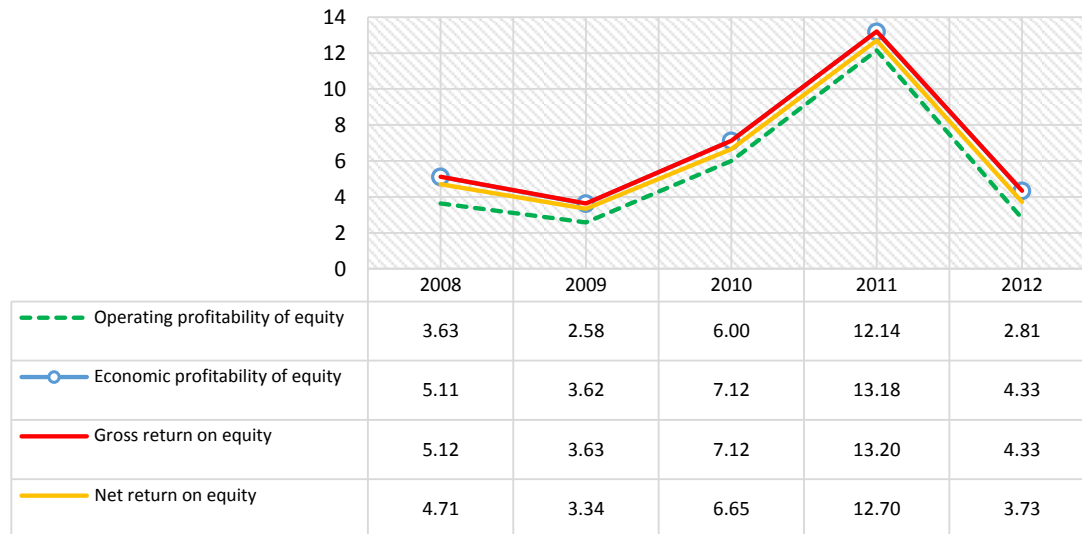
	2008	2009	2010	2011	2012
- - - Operating profitability of equity	3.63	2.58	6.00	12.14	2.81
—o— Economic profitability of equity	5.11	3.62	7.12	13.18	4.33
—— Gross return on equity	5.12	3.63	7.12	13.20	4.33
—— Net return on equity	4.71	3.34	6.65	12.70	3.73

Figure 2. Return on equity (%) of the State Forests in 2008–2012

Source: Own calculations based on data from the annual financial statements of the State Forests in 2008–2012
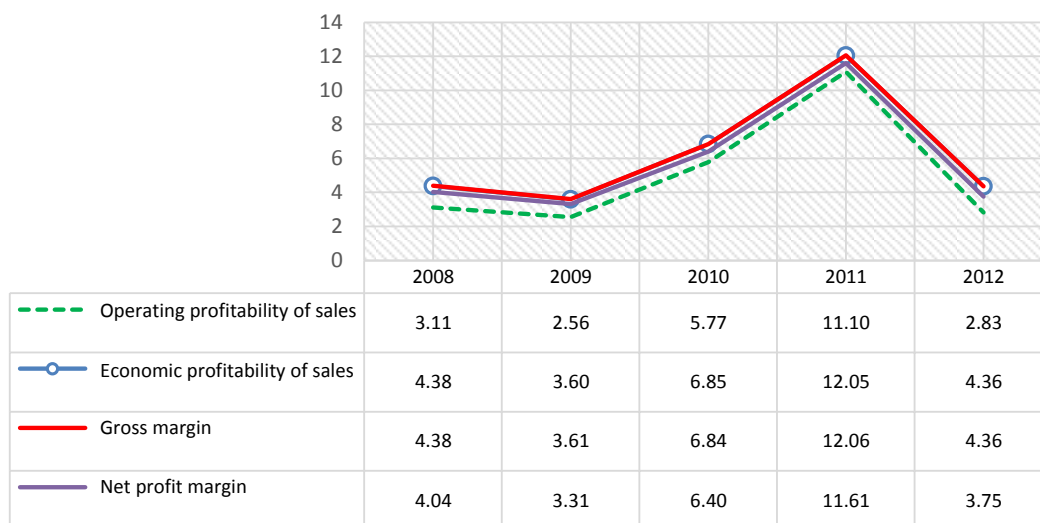
	2008	2009	2010	2011	2012
- - - Operating profitability of sales	3.11	2.56	5.77	11.10	2.83
—o— Economic profitability of sales	4.38	3.60	6.85	12.05	4.36
—— Gross margin	4.38	3.61	6.84	12.06	4.36
—— Net profit margin	4.04	3.31	6.40	11.61	3.75

Figure 3. Return on sales (%) of the State Forests in 2008–2012

Source: Own calculations based on data from the annual financial statements of the State Forests for in 2008–2012

extends of the conducted by business economic activities, is also quite important in profitability analysis. The construction of profitability ratios commonly includes a net or gross result (Olzacka, Pałczyńska-Gościniak 2000; Bień 2002; Waśniewski, Skoczylas 2002). A net result, as an economic category, presents an entire range of indicators affecting the efficiency of economic activities starting with directed thoughtful decisions taken by business administration, through factors independent of administrative decisions such as random events or taxation ordinance. From the other side, profitability ratios based on gross results have such an advantage that their level is not linked to the degree of profit taxing. A gross result of economic activity reflects a more narrow range of business activity effects because of the fact that it does not consider the influence of extreme gains and losses.

Financial analysis more and more often takes into consideration operational results within the structure of profitability ratios (Tyran 2000; Kurtys 2004). While establishing the profitability at the operating level, only the effects of principal business activities such as the result of product sales as well as the results of remaining operational activities are included. What is important is that results of financial activities as well as effects of extraordinary events are not taken into consideration. Profitability analysis through time requires concentrating the attention on activities typical for a given enterprise, whilst the effect of remaining factors (financial or extraordinary) in that case are of secondary importance (Leszczyński, Skowronek-Mielczarek 2000). Long-term functioning of an economic entity should be linked with its development, which is, first of all, determined by its ability to generate profits from the economic means involved in operational activities.

Whilst evaluating the profitability of the SF, specifics of forest management and limited possibility of profit maximising because of the necessity to implement statutory tasks should be taken into account. Along with evolving views on forest functions, there were also changes in the perception of economic functioning of forest economy. The SF, which operate within the conditions of market economy, implement various functions including productive, ecological and social functions. Provision of non-productive forest functions is linked to amounting costs with the lack of revenues, which could be used to cover those costs. All forest functions could be implemented only in the conditions of financial self-reliance of the SF. Beneficial correlation between the acquired costs and the received revenues and as a consequence the ability to generate profits ensure not only financial stability but also a possibility to continue sustainable forest management in the SF. In the context of those conditions, measuring and evaluating profitability of economic entity should present an important element of implementing forest management activities.

Based on the conducted research study, it could be stated that

1. In 2008–2012, business activity of the SF was profitable, whilst the profitability ratios analysed through time presented significant differences as well as direction and rate of changes. Variation of profitability ratios was affected by the changes in the level of profits generated by the SF as well as the changes in the level of assets, sales and equity occurring in various years of the study period.

2. Values and differences between the analysed operational, economic, gross and net profitability ratios were regulated by the structure of generated profits from various types of activities. During the study period, those indicators showed slight variation depending on the use in calculations of category of financial result.

The lowest returns on assets, equity and sales were received by the SF from the operating activities, whilst the highest values of those indicators were reached at the gross level of financial result. Economic profitability ratios and related to them gross profitability ratios had similar or approaching values, which could be explained by the marginal effect of extreme events on the financial result of the SF.

There were also small differences between gross and net profitability ratios. It could be explained by the fact that administrative and economic activities of the SF are free of corporate income tax (CIT). Whilst additional activities, which are subject to taxation because of their small share in cost and revenue structure, have only a small influence on financial result of the SF.

3. Profitability ratios based on the accounting metrics could be used for general evaluation of the profitability of the SF. The larger role should be given to more decisive indicators, the level of which would result from decisions linked to existent management staff of the SF. Because of that, the long-term profitability analysis should, first of all, include the indicators set at the operational level, where the influence of external factors is the lowest.

In the spatial analysis of the SF units, profitability ratios based on accounting metrics have a lower significance because of geographical diversification of forest products as well as disturbances resulting from the functioning regime of forest fund. In order to make a more objective evaluation and a possibility of comparing the SF units, the analysis should include the indicators quantifying the dynamics of natural conditions in forests as well as the payments to forest fund.

4. The implemented profitability analysis based on the accounting metrics is considered to be an external analysis, the extend of which was determined by the information included in the financial reports published by the SF. It, therefore, has a synthetic character and could only be treated as introductory analysis, the role of which is to conduct general evaluation of

the ability of the SF to generate profits. Owing to the fact that interpretation of specific situations based on synthetic indicators is practically impossible (Duraj 1993), using the profitability analysis based on accounting metrics for internal purposes of the SF requires deeper evaluation, which should be widened to the cause analysis. When linked with other analytical tools, it could fully implement its analytical functions and serve for forecasting future conditions of the activities of the SF.

Conflict of interests

The authors declare the lack of potential conflicts.

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Authors' contribution

AAJ – study conception, literature review, data analysis, preparation of manuscript, text editing; JG – data collection and editing (tables and figures).

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